

d. **Remarks**

AMENDMENTS

The amendments to claims 1, 2, and 13 are, e.g., supported between page 8, line 26, and page 9, line 7, and in Fig. 4 of the original application and between page 7, line 25, and page 8, lines 6, and in Fig. 4 of the priority provisional application.

OBVIOUSNESS REJECTIONS

A) At page 2; the Office Action rejects claims 1, 6, 8, 10-13, and 15-19 as obvious over combinations of an article of Paiella et al at IEEE Transactions on Photonics Technology Letters Vol. 12, No. 7 (2000) pages 780 – 782 (Herein, referred to as the “Paiella article”.); U.S. Patent Application Publication 2002/0181059 of Christopher (Herein, referred to as Christopher.); U.S. Patent 6,816,682 of Ionov et al (Herein, referred to as Ionov.); U.S. Patent 6,823,141 of Miyauchi et al (Herein, referred to as Miyauchi.); and U.S. Patent 5,099,489 of Levy et al (Herein, referred to as Levy) or U.S. Patent 6,310,995 of Saini et al (Herein, referred to as Saini.).

Claims 1 and 13

A present claim 1 recites:

the modulating including DC biasing a pumping voltage for the mid-IR laser to be 0.001 volts to 0.1 volts from a lasing threshold of the mid-IR laser ...
(underlining added).

Present claim 13 recites:

the modulator is configured to DC bias a pumping voltage for the mid-IR laser to be 0.001 volts to 0.1 volts from a lasing threshold of the mid-IR laser.
(underlining added).

At page 4, lines 8 – 9, the Office Action states that its combination of Paiella, Christopher, Ionov, and Miyauchi “fails to teach a DC bias of 0.001 volt to 0.1 volt from a lasing threshold.” The Office Action continues in stating that Levi or Saini teach such a feature. That is, the Office Action relies on Saini or Levy to teach the DC biasing feature of claims 1 and 13.

While present claims 1 and 13 recite DC biasing a pumping voltage to be 0.001 volts to 0.1 volts from a lasing threshold, the parts of Levi or Saini on which the Office Action relies do not suggest such a limitation on a pumping voltage.

With respect to Levi, the Office Action states:

Levi et al. teaches in col. 7, lines 5-7, a switching voltage of 30 mV.
Office Action, page 4, line 11.

While col. 7, lines 1 – 8, of Levi may describe a voltage in the range of .001 volts to 1.0 volts, the voltage is a switching voltage rather than a pumping voltage as recited in claims 1 and 13. In Figure 1, Levy describes the switching voltage, V_A , as being applied across metal contact stripes 21 and 13. Also, at col. 6, lines 22 – 24, Levy describes the metal contact stripe 21 as controlling a “loss” section of laser 10 rather than a pumping section. Indeed, Levy describes different metal contact stripes 20 as controlling the “gain” or pumping sections of the laser of Fig. 1. Thus, at col. 7, lines 5-7, the Office Action relies on teachings that do not limit pumping voltages. For that reason, the Office Action does not provide a teaching for the above-recited feature of present claims 1 and 13.

With respect to Saini, the Office Action states:

Saini et al. teaches in col. 9, lines 30-33 a switch voltage of 0.1 Volt.
Office Action, page 4, line 12.

While col. 9, lines 30 – 33, of Saini may describe a voltage in the range of about 1 volt to about 0.1 volts, the voltage is a switching voltage rather than a pumping voltage as recited in present claims 1 and 13. The portion of Saini cited in the Office Action describes a switchable device 90 shown in Figures 10A – 1C. As Figure 10A shows, the switchable device 90 includes a first electrode 92 for providing gain or pumping and a second electrode 94 for causing a reverse bias in another region of the device. From col. 9, line 48 – 49, of Saini, it is clear that the electrode that applies the reverse bias is the electrode that controls switching. That is, the electrode 94, which does not pump the laser, provides the switching. For this reason, the cited teaching at col. lines 31 – 33 of Saini is not a limitation about a pumping voltage. Thus, the Office Action does not provide a teaching for the above-recited features of present claims 1 and 13.

Due to the absence of prior art citations for the above-recited features of claims 1 and 13, the Office Action does not provide a prima facie case of obviousness for either present claim 1 or present claim 13.

Dependent claims 6, 8, 10 – 12, and 15 – 19

Dependent claims 6, 8, and 10 – 12 are non-obvious over the art as applied in the Office Action, at least, by their dependence on claim 1.

Dependent claims 15 – 19 are non-obvious over the art as applied in the Office Action, at least, by their dependence on claim 13.

B) At page 5, the Office Action rejects claims 2, 7, and 9 as obvious over a combination of the Paiella article, Christopher, Ionov, and Levy or Saini.

A present claim 2 recites:

the modulating including DC biasing a pumping voltage for the mid-IR laser to be 0.001 volts to 0.1 volts from a lasing threshold of the mid-IR laser ...

(underlining added).

At page 7, lines 4 – 5, The Office Action states that its combination of Paiella, Christopher, and Ionov “fails to teach a DC bias of 0.001 volt to 0.1 volt from a lasing threshold.” The Office Action continues in stating that Levi or Saini teach such a feature. The Office Action relies on Saini or Levy to teach the DC biasing feature of claim 2.

While present claim e recites “DC biasing a pumping voltage ... to be 0.001 volts to 0.1 volts from a lasing threshold lasing threshold”, the cited parts of Levi and Saini do not teach such a limitation on a pumping voltage.

With respect to Levi, the Office Action states:

Levi et al. teaches in col. 7, lines 5-7, a switching voltage of 30 mV.
Office Action, page 7, line 7.

While col. 7, lines 1 – 8, of Levi may describe a voltage in the range of .001 volts to 1.0 volts, the voltage is a switching voltage, V_A , rather than a pumping voltage as recited in present claim 2. In particular, Figure 1 of Levy shows a voltage, V_A , applied across the metal contact stripes 21 and 13. At col. 6, lines 22 – 24, of Levy describes the metal contact stripe 21 as controlling a “loss” section of laser 10 rather than a pumping or gain section. Indeed, the same part of Levy describes a different metal contact stripe 20 as controlling the gain section of the laser of Fig. 1. Thus, the teaching about the voltage, V_A , on which the Office Action relies, is not a teaching about a pumping voltage. For that reason, the Office Action does not provide a teaching for the above-recited feature of present claim 2.

With respect to Saini, the Office Action states:

Saini et al. teaches in col. 9, lines 30-33 a switch voltage of 0.1 Volt. Office Action, page 7, line 7 – 8.

While col. 9, lines 30 – 33, of Saini may describe a voltage in the range of 0.1 volts to 1 volt, the voltage is a switching voltage rather than a pumping voltage as recited in present claim 2. In particular, the part of Saini cited in the Office Action describes a switchable device 90 of Figures 10A – 1C. As Figure 10A shows, the switchable device 90 includes one electrode 92 for providing gain or pumping and another electrode 94 for reverse biasing another part of the device. From col. 9, line 48 – 49, of Saini it is clear that the electrode that applies the reverse bias is the electrode that controls switching. That is, the switching is performed by electrode 94 rather than by electrode 90, which pumps or gain-controls the device. Thus, at col. lines 31 – 33, Saini describes limitations on switching voltages rather than pumping voltages. For that reason, the Office Action does not provide a teaching for the above-recited feature of present claim 2.

Due to the absence of a prior art citation for the above-cited feature of claim 2, the Office Action does not provide a prima facie case of obviousness for present claim 2.

Dependent claims 7 and 9

Dependent claims 7 and 9 are non-obvious over the art as applied in the Office Action at least by their dependence on claim 2.

C) At page 7, the Office Action rejects claim 3 as obvious over a combination of the Paiella article, Christopher, Ionov, Levy or Saini, and U.S. Patent 6,549,556 of Hwang et al (Herein, referred to as Hwang.).

Dependent claim 3 is non-obvious over the art as applied in the Office Action, at least, by its dependence on claim 2.

D) At page 8, the Office Action rejects claim 20 as obvious over a combination of the Paiella article, Christopher, Ionov, Miyauchi, Levy or Saini, and U.S. Patent 6,016,212 of Durant et al.

Dependent claim 20 is non-obvious over the art as applied in the Office Action, at least, by its dependence on claim 13.

E) At page 9, the Office Action rejects claims 21 – 22 as obvious over a combination of the Paiella article, Christopher, Ionov, Miyauchi, Levy or Saini, and Hwang.

Dependent claims 21 – 22 are non-obvious over the art as applied in the Office Action, at least, by their dependence on claim 13.

F) At page 10, the Office Action rejects claims 14, and 23 – 24 as obvious over a combination of the Paiella article, Christopher, Ionov, Miyauchi, Levy or Saini, and “Optical Networks: a Practical Perspective” by Ramaswami et al, Academic Press, 1998, pages 177 – 180.

Dependent claims 14 and 23 – 24 are non-obvious over the art as applied in the Office Action, at least, by their dependence on claim 13.

Conclusion

For the above reasons, Applicant respectfully requests that the claims be allowed as presented herein.

In the event of any non-payment or improper payment of a required fee, the Commissioner is authorized to charge or to credit **Lucent Technologies Deposit Account No. 12-2325** to correct the error.

Respectfully,

A handwritten signature in dark ink, appearing to read "John F. McCabe", is written over a horizontal line.

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Date: Sept. 18, 2006
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b. Amendments to the Specification

None